CITY ICE AND COLD STORAGE COMPANY

459 Colman Bldg., Seattle, Washington 98104
PHONE (206) 622-4600 TWX 910-444-4192 TELEX 75-9030 FACSIMILE 206-285-7428

cc: D. Eggerbo

September 1, 1987

Ms. Carol Sanders
Assistant Director of
Marine Terminals
PORT OF SEATTLE
P. O. Box 1209
Seattle, WA 98111

Subject: Summary of Supplemental Monitor Well Measurement/
New Building Site

Dear Carol:

I believe that the test report speaks for itself and I hope that we can now proceed to finalize a lease document. For your information, our footings for the building will be approximately two feet below the surface level. This is three feet above the level at which hydrocarbons would be anticipated.

Please let me know when we can get together for final discussions.

Thanking you and awaiting your advice, I remain,

Yours very truly,

John C. Rosling
President

JCR:se

enclosure

cc: Mr. James Rice

GeoEngineers
Incorporated

(206) 746-5200
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2405 - 140th Ave. N.E.
Bellevue, WA 98005

Consulting Geotechnical
Engineers and Geologists

August 31, 1987

City Ice and Cold Storage Company
259 Coleman Building
Seattle, Washington 98104

Attention: Mr. John C. Rosling, President

Gentlemen:

Summary of Supplemental
Monitor Well Measurements
Proposed Facility Expansion
Seattle, Washington
File No. 1074-02-1

INTRODUCTION

The results of our supplemental monitor well measurements at the site of your proposed facility expansion in the Pier 91 area are presented in this report. The results of our earlier studies at the site are presented in our reports of February 10, 1987 and June 26, 1987. We understand that the proposed building site for your facility expansion has been modified; the currently planned building site is located approximately 60 feet north of the location indicated in our two earlier submittals.

Boring 2 and Boring MW-1 of our earlier studies encountered strong petroleum odors in the subsoils. Slight petroleum odors were also detected in Borings 1 and 4. Hydrocarbon vapor measurements in the PVC well casing for MW-1 indicated a vapor concentration of 900 parts per million (ppm) on June 23, 1987.

The purpose of this supplemental study is to develop additional information regarding the chemical character of the hydrocarbon vapors and ground water in MW-1.

FIELD SAMPLING

A hydrogeologist from our staff visited the site on August 19, 1987 to sample MW-1. Our representative measured the air space in the monitor well casing for hydrocarbon vapors with our TLV Sniffer and recorded a vapor concentration of 62 ppm. This was much lower than the initial measurement in MW-1 of 900 ppm on June 23. A sample of the gas in the well casing was obtained in a stainless steel cylinder and the gas sample was transported to the laboratory of Farr, Friedman and Bruya, Inc. for analysis.

Water in the well casing was purged by removing 10 gallons of water with a stainless steel bailer. A teflon bailer was then used to obtain a water sample for laboratory analysis.

We visited the site again on August 25 to remeasure the hydrocarbon vapor concentration in MW-1. The vapor concentration on that date was measured at 185 ppm.

ANALYTICAL RESULTS

The laboratory analytical results are attached. The vapor sample from MW-1 indicated the presence of approximately 20 ppm of methane (not of fuel origin) and a trace amount of toluene (probably of fuel origin). The hydrocarbon concentrations found in the gas sample are far below flammability levels and below levels of significance for human health in short-term exposure.

The water sample indicated 5 ppm petroleum hydrocarbons, a trace of diesel fuel, plus benzene and ortho xylene at concentrations of 30 parts per billion (ppb) and 20 ppb, respectively. These water quality results confirm fuel contamination of the shallow ground water in the vicinity of MW-1. No volatile organic compounds typical of solvent contamation were found in the ground water from MW-1. No free (floating) hydrocarbons were found in MW-1 on June 23, August 19 or August 25.

DISCUSSION

Considering the environmental setting of the planned facility and the results of our studies, it is our opinion that the existing subsurface fuel contamination in the planned building area does not represent a significant environmental hazard. Fuel vapors, if encountered during construction, appear to be manageable by natural or induced ventilation. Similarly, the air space beneath the planned facility should be adequate to vent fuel vapors that may migrate beneath the structure.

The benzene concentration found in water obtained from MW-1 (30 ppb) exceeds drinking water standards (5 ppb). However, shallow ground water does not appear to be used for human consumption in the Pier 91 area. Benzene in shallow ground water at the site does not represent a threat to the existing artesian well on the property (which is planned to be capped) because shallow ground water cannot flow to the confined aquifer tapped by the well (due to pressure differences).

10 x DWS = 50

Despite our opinion that existing subsurface fuel contamination poses no significant environmental hazards and no unmanageable risks to your planned facility, there remains a potential for future cleanup actions at the site. The Washington Department of Ecology (WDOE) has recently begun enforcing a cleanup level of 200 ppm for hydrocarbons in soil. Although we did not specifically analyze the contaminated soil in Boring 2 and Boring MW-1 for hydrocarbons, we estimate that fuel concentrations in the on-site subsoils locally exceed this level based on our past experience. The risk that a soil cleanup could be mandated at this site is small, in our opinion, but it cannot be discounted.

We are not aware of any requirements to report fuel contamination of soil to WDOE unless there is free oil on the water table (no free oil has been detected in MW-1). However, future regulations may require retroactive reporting of sites with known subsurface fuel contamination. Furthermore, if contaminated soils are encountered in construction excavations for your planned facility, reporting of the contamination would be a normal procedure, particularly if the contaminated soil is disposed of off-site.

RECOMMENDATIONS

The potential for encountering fuel contamination appears to be reduced in your modified building location, as compared to the original building site. We recommend that the following steps be taken to further reduce the risk of finding fuel contamination in subsoils at the site:

1. Limit all excavations for utilities, pile caps and foundations to the shallowest practical depth that will afford protection from frost penetration and provide adequate embedment for foundations.
2. Route utilities into the building from the north end of the building site.
3. Avoid excavations in the southeastern portion of the building area, if possible.

We should be consulted to evaluate site conditions if fuel contamination is encountered during construction.

LIMITATIONS

The conclusions and recommendations made in this report are based on limited subsurface data. Variations in subsurface conditions should be expected from those encountered in our explorations. The conclusions and recommendations reached by our firm for this project may not be applicable to other sites.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in this area at the time of report preparation. No other conditions, express or implied, should be understood.

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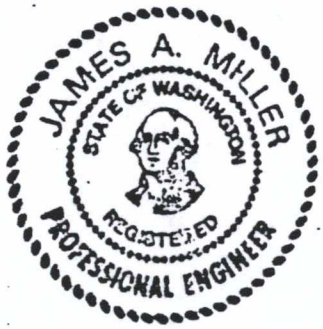
Please call if you have any questions regarding this report or if we may be of further service.



Yours very truly,

GeoEngineers, Inc.

James A. Miller

James A. Miller
Principal

JAM:wd

Attachments

Three copies submitted

cc: Mr. Gary Ostle
Derek Arndt Construction Co.
11060 - 118th Place N.E.
Kirkland, WA 98033

FARR, FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James K. Farr, Ph.D.
Andrew John Friedman
James E. Bruya, Ph.D.

3008 B - 16th West
Seattle, WA 98119
(206) 285-8282

August 25, 1987

John Biggane, Project Manager
GeoEngineers, Inc.
2405 - 140th Avenue N.E., Suite 105
Bellevue, WA 98005

Dear Mr. Biggane:

Results of the gas and ground water sample for the City Ice Project #1074-02 are enclosed.

The aqueous sample was analyzed for Total Petroleum Hydrocarbons using thin layer chromatography; Gasoline/Diesel and BTEX were run by the usual gas chromatographic methods.

Hexane: 100 µl of hexane was mixed with 9.9 mL of chromatography grade CS_2. From this stock solution, three working solutions were prepared by diluting 8 µl, 80 µl and 800 µl to 10 mL with CS_2, respectively. These working solutions were used to generate the gas standards by taking 10 µl of the solution and injecting it into a Teflon capped 20 mL glass vial, giving final gas concentrations (after 10 min. equilibration) of 35 ng/mL, 35 ng/mL and 350 ng/mL.

Standards for Benzene, Toluene and Xylenes were prepared similarly. The halogenated hydrocarbon standards were prepared by injecting 7.5 and 1.5 µl of a 100 ppm stock of the analytes into a 20 mL Teflon capped vial containing 15 mL of water. A calibration curve was prepared by repeated injections of 37,500 and 7,500 pg/mL of the analytes. Methane standards were prepared by dilution of a 99.95% primary standard to give 100, 50 and 1 ppm concentrations.

If you have any questions about the results, please call me at 285-8282.

Sincerely,

James K. Farr, Ph.D.
Chemist

JKF/cag

FAR FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: August 25, 1987

Date Submitted: August 19, 1987

RESULTS OF ANALYSIS OF WATER SAMPLE FOR BTX AND ETHYLBENZENE. CITY ICE SITE #1074-02

Sample #	Benzene (ppm)	Toluene (ppm)	Xylene *m,p* (ppm)	Xylene *o* (ppm)	Et-Benzene (ppm)
MW-1	30	<10	<10	20	<10
Quality Assurance					
Blank	<10	<10	<10	<10	<10

FA[redacted]R, FRIEDMAN & BRUYA, INC.
ENVIRONMENTAL CHEMISTS

Date of Report: August 25, 1987

Date Submitted: August 19, 1987

RESULTS OF ANALYSIS OF GAS SAMPLE FOR BTX AND ETHYLBENZENE CITY ICE SITE #1074-02

Sample #	Benzene (ppm)	Toluene (ppm)	Xylene *m,p* (ppm)	Xylene *o* (ppm)	Et-Benzene (ppm)
MW-1	<1	Trace[a]	<1	<1	<1
Quality Assurance					
Blank	<1	<1	<1	<1	<1

[a] - Contamination estimated at 1-5 ppm.

FA[redacted], FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: August 25, 1987

Date Submitted: August 19, 1987

RESULTS OF ANALYSIS OF GAS SAMPLE FOR TOTAL HYDROCARBONS AND METHANE CITY ICE SITE # 1074-02

Sample #	Total Hydrocarbons *as n*-Hexane ppm (v/v)	Methane ppm (v/v)
MW-1	<100	20
Quality Assurance		
Blank	<100	
MW-1 Duplicate		25

FA[redacted], FRIEDMAN & BRUYA, INC. [redacted]

ENVIRONMENTAL CHEMISTS

Date of Report: August 25, 1987

Date Submitted: August 19, 1987

RESULTS OF ANALYSIS OF WATER SAMPLE FOR GASOLINE, DIESEL #1, DIESEL #2 AND TOTAL PETROLEUM HYDROCARBONS CITY ICE SITE #1074-02

Sample #	Gasoline (ppm)	Diesel #1 (ppm)	Diesel #2 (ppm)	Total Petroleum Hydrocarbons (ppm)
MW-1	<1.[a]	<1.[a,b]	<10.[a,b]	5.[c]

[a] - After 100/1 concentration of sample extract.

[b] - A trace of diesel was observed.

[c] - After 10/1 concentration of sample extract.

FA[redacted] FRIEDMAN & BRUYA, INC.
ENVIRONMENTAL CHEMISTS

Date of Report: August 25, 1987

Date Submitted: August 19, 1987

ANALYSIS OF GAS SAMPLE FOR SELECTED ANALYTES.

Sample #	MW-1
Date:	ppm (v/v)
Analyte	
Vinyl Chloride	<1
1,1-Dichloroethylene	<1
Methylene Chloride	<1
t-Dichloroethylene	<1
1,1-Dichloroethane	<1
1,1,1-Trichloroethane	<1
1,2-Dichloroethane	<1
Trichloroethylene	<1
Tetrachloroethylene	<1